

WHAT IS CLAIMED IS:

1. An image processing apparatus comprising:
a partial codestream truncating unit to partially truncate ordinarily encoded data of an image to create a truncated codestream, in accordance with a selectively truncation command; and
a restoration unit to, in accordance with an undo command, restore the original encoded data from which the truncated code stream was created temporarily by the partial codestream truncating unit.

2. The image processing apparatus according to claim 1, wherein the partial codestream truncating unit partially truncates the ordinarily encoded data by turning the original encoded data into second encoded data such that turning the original encoded data into the second encoded data causes the truncated codestream to be stored, wherein the second encoded data does not include the truncated codestream, and
wherein the restoring unit combines the second encoded data and the stored truncated codestream to restore the original encoded data.

3. The image processing apparatus according to claim 2, further comprising code line discarding unit for discarding the stored truncated codestream in accordance with an undo releasing command.

4. The image processing apparatus according to claim 1, wherein the partial codestream truncating unit changes original tag information of the original encoded data to second tag information indicating that the truncated codestream is not subjected to decoding, and
wherein the restoring unit turns the second tag information back into the original tag information to restore the original encoded data.

5. The image processing apparatus according to claim 4, further comprising a code line discarding unit to discard the truncated codestream with respect to which the truncating unit changed the original tag information to the second tag information, in accordance with an undo releasing command.

6. The image processing apparatus according to claim 1, wherein the image is a moving image having a group of frames,

the partial codestream truncating unit temporarily truncates, as the truncated codestream, entire encoded data of at least one frame of the moving image from the group of frames of the moving image to cause the entire encoded data of the at least one frame to be stored, and

wherein the restoring unit includes the entire encoded data of the at least one frame in the group of frames of the moving image to restore the original encoded data.

7. The image processing apparatus according to claim 1, wherein the image is a moving image having frames,

the partial codestream truncating unit adds, to entire encoded data of at least one frame of the moving image, information indicating that the entire encoded data as the truncated codestream is not subjected to decoding, and

the restoring unit discards the information added to the encoded data of the at least one frame to restore the original encoded data.

8. The image processing apparatus according to claim 6, further comprising a code line discarding unit to discard the stored entire encoded data of the at least one frame in accordance with an undo releasing command.

9. The image processing apparatus according to claim 7, further comprising a code line discarding unit to discard the entire encoded data of the at

least one frame with respect to which the truncating unit added the information to the encoded data of the at least one frame.

10. The image processing apparatus according to claim 2, further comprising a unit to enable a user to select a unit that is processed as the truncated codestream.

11. The image processing apparatus according to claim 6, further comprising a unit to enable a user to select a method of selecting a frame that is processed as the truncated codestream.

12. The image processing apparatus according to claim 7, further comprising a unit to enable a user to select a method of selecting a frame that is processed as the truncated codestream.

13. The image processing apparatus according to claim 6, further comprising a selecting unit to automatically select a frame that is processed as the truncated codestream.

14. The image processing apparatus according to claim 7, further comprising a selecting unit to automatically select a frame that is processed as the truncated codestream.

15. The image processing apparatus according to claim 13, wherein the selecting unit automatically selects, as the truncated codestream, a frame with less movement, every Nth frame, a frame having large camera vibration, or a frame that does not include a person.

16. The image processing apparatus according to claim 14, wherein the

selecting unit automatically selects, as the truncated codestream, a frame with less movement, every Nth frame, a frame having large camera vibration, or a frame that does not include a person.

17. The image processing apparatus according to claim 1, wherein the image is a moving image having frames, the truncated codestream is entire encoded data of at least one frame of the moving image, and one of a frame with less movement, every Nth frame, a frame having large camera vibration, and a frame that does not include a person is automatically selected as the truncated codestream.

18. The image processing apparatus according to claim 17, wherein the frame with less movement is selected, and the image processing apparatus further comprises an analyzing unit to compare a code amount of a current frame of the moving image with a code amount of a frame preceding the current frame, and determining the current frame has less movement than the frame preceding when a difference between the code amount of the current frame and the code amount of the frame preceding the current frame is smaller than a threshold value.

19. The image processing apparatus according to claim 17, wherein the frame having large camera vibration is selected, and the image processing apparatus further comprises an analyzing unit to determine a degree of camera vibration based on wavelet coefficients that are obtained when each frame of the moving image is compressed and encoded.

20. The image processing apparatus according to claim 19, wherein the analyzing unit determines the degree of camera vibration based on values:

$$Y_v = a_v \cdot \sum |1HL| + b_v \cdot \sum |2HL| + c_v \cdot \sum |3HL| ; \text{ and}$$

$$Y_h = a_h \cdot \sum |1LH| + b_h \cdot \sum |2LH| + c_h \cdot \sum |3LH| ,$$

where the values Y_v and Y_h are based on a two-dimensional wavelet transformation

with a decomposition levels 0, 1, 2 and 3, Y_v corresponds to a vertical direction of the frame, Y_h corresponds to a horizontal direction of the frame, 1HL, 2HL, and 3HL correspond to high-frequency sub-bands of the wavelet coefficients at the decomposition level 1, 2, and 3, respectively, 1LH, 2LH, and 3LH correspond to high-frequency sub-bands of the wavelet coefficients at the decomposition levels 1, 2, and 3, respectively, and a_v , b_v , c_v , a_h , b_h , and c_h are constants equal to or larger than 0.

21. The image processing apparatus according to claim 17, further comprising an analyzing unit to recognize a face of a person, and determining a frame that does not include a recognized face as the frame that does not include a person.

22. The image processing apparatus according to claim 1, further comprising:

a decoding and expanding unit to decode and expand second encoded data to reproduce an image based on the second encoded data, the second encoded data being generated by partially truncating the truncating some form ordinarily encoded data; and

a display unit to display the reproduced image.

23. The image processing apparatus according to claim 1, further comprising:

a decoding and expanding unit to decode and expand the original encoded data or the restored original encoded data to reproduce the image; and

a display unit to display the reproduced image.

24. The image processing apparatus according to claim 1, wherein the original encoded data is based on JPEG2000 or Motion-JPEG2000.

25. The image processing apparatus according to claim 10, wherein the unit that is processed as the truncated codestream is one of a layer, a resolution level, a bit plane, a tile, a packet, and a component.

26. A method of processing an image, comprising :

(a) partially truncating ordinarily encoded data of an image to create a truncated codestream in accordance with a selectively truncation command; and
(b) restoring the original encoded data from which the truncated code stream was created temporarily by the partial codestream truncating unit, in accordance with an undo command.

27. The method according to claim 26, wherein partially truncating ordinarily encoded data comprises:

turning the original encoded data into second encoded data such that the second encoded data does not include the truncated codestream; and

storing the truncated codestream, and further wherein restoring the original encoded data comprises:

combining the second encoded data and the stored truncated codestream to restore the original encoded data.

28. The method according to claim 27, further comprising discarding the stored truncated codestream in accordance with an undo releasing command.

29. The method according to claim 26, wherein partially truncating ordinarily encoded data comprises:

changing original tag information of the original encoded data to second tag information indicating that the truncated codestream is not subjected to decoding, and further wherein restoring the original encoded data comprises:

turning the second tag information back into the original tag

information.

30. The method according to claim 29, further comprising discarding the truncated codestream with respect to which the original tag information was changed to the second tag information, in accordance with an undo releasing command.

31. The method according to claim 26, wherein the image is a moving image having a group of frames, and wherein partially truncating ordinarily encoded data comprises:

temporarily truncating, as the truncated codestream, entire encoded data of at least one frame of the moving image from the group of frames of the moving image; and

storing the stored entire encoded data of the at least one frame, and further wherein restoring the original encoded data comprises:

including the temporarily truncated entire encoded data of the at least one frame in the group of frames.

32. The method according to claim 26, wherein the image is a moving image having frames, and wherein partially truncating ordinarily encoded data comprises:

adding, to encoded data of at least one frame of the moving image, information indicating that the entire encoded data of the at least one frame as the truncated codestream is not subjected to decoding, and further wherein restoring the original encoded data comprises:

discarding the information added to the encoded data of the at least one frame.

33. The method according to claim 31, further comprising :

discarding the stored entire encoded data of the at least one frame, in

accordance with an undo releasing command.

34. The method according to claim 32, further comprising :
discarding the entire encoded data of the at least one frame to which the
information was added, in accordance with an undo releasing command.

35. The method according to claim 27, wherein a unit that is processed as
the truncated codestream is selected by a user.

36. The method according to claim 35, wherein the unit that is processed as
the truncated codestream is one of a layer, a resolution level, a bit plane, a tile, a
packet, and a component.

37. The method according to claim 31, further comprising :
(c) automatically selecting a frame that is processed as the truncated
codestream.

38. The method according to claim 32, further comprising :
(c) automatically selecting a frame that is processed as the truncated
codestream.

39. The method according to claim 37, wherein automatically selecting the
frame that is processed comprises automatically selecting a frame with less movement,
every Nth frame, a frame having large camera vibration, or a frame that does not
include a person.

40. The method according to claim 38, wherein automatically selecting the
frame that is processed comprises automatically selecting a frame with less movement,
every Nth frame, a frame having large camera vibration, or a frame that does not

include a person.

41. The method according to claim 26, wherein the original encoded data is based on JPEG2000 or Motion-JPEG2000.

42. The method according to claim 26, further comprising :
decoding and expanding the second encoded data to reproduce an image based on the second encoded data, the second encoded data being generated by partially truncating the truncating some form ordinarily encoded data; and
displaying the reproduced image.

43. The method according to claim 26, further comprising :
decoding and expanding the original encoded data or the restored original encoded data to reproduce the image; and
displaying the reproduced image.

44. An article of manufacture having one or more computer readable storing media that store instructions which, when executed by a system, cause the system to process an image by:

partially truncating ordinarily encoded data of an image to create a truncated codestream in accordance with a selectively truncation command; and

restoring the original encoded data from which the truncated code stream was created temporarily by the partial codestream truncating unit, in accordance with an undo command.

45. The article of manufacture according to claim 44:
wherein partially truncating the ordinarily encoded data comprises turning the original encoded data into second encoded data such that the second encoded data does not include the truncated codestream; and

storing the truncated codestream, and wherein restoring the original encoded data comprises:

a program code of combining the second encoded data and the stored truncated codestream to restore the original encoded data.

46. The article of manufacture according to claim 45, the instructions further comprising instructions which, when executed, cause the system to discard the stored truncated codestream in accordance with an undo releasing command.

47. The article of manufacture according to claim 44:

wherein partially truncating the ordinarily encoded data comprises changing original tag information of the original encoded data to second tag information indicating that the truncated codestream is not subjected to decoding, and wherein restoring the original encoded data comprises:

turning the second tag information back into the original tag information.

48. The article of manufacture according to claim 47, the instructions further comprising instructions which when executed cause the system to discard the truncated codestream with respect to which the original tag information was changed to the second tag information, in accordance with an undo releasing command.

49. The article of manufacture according to claim 44:

wherein partially truncating the ordinarily encoded data comprises temporarily truncating, as the truncated codestream, all encoded data of at least one frame of the moving image from the group of frames of the moving image;

storing the stored entire encoded data of the at least one frame, and wherein restoring the original encoded data comprises:

a program code of including the temporarily truncated entire encoded

data of the at least one frame in the group of frames.

50. The article of manufacture according to claim 44:

wherein partially truncating the ordinarily encoded data comprises adding, to encoded data of at least one frame of the moving image, information indicating that the entire encoded data of the at least one frame as the truncated codestream is not subjected to decoding, and wherein restoring the original encoded data comprises:

discarding the information added to the encoded data of the at least one frame.

51. The article of manufacture according to claim 49, the instructions further comprising:

instructions which, when executed by the system, cause the system to discard the stored entire encoded data of the at least one frame, in accordance with an undo releasing command.

52. The article of manufacture according to claim 50, the instructions further comprising:

instructions which, when executed by the system, cause the system to discard the entire encoded data of the at least one frame to which the information was added, in accordance with an undo releasing command.